Chapter 10

INFORMATION TECHNOLOGY AND INFRASTRUCTURE

GENERAL

The purpose of this chapter is to provide information and insight into the issues concerning the use and development of a significant new topic of importance for both Grant County, the Northern Kentucky Area, and for other communities across the nation: the rapidly developing field of information technology and its accompanying infrastructure. The potential impact on communities is tremendous in scope, and it appears that much education and planning is necessary in order to be prepared to address these new issues. This chapter will present some basic background information about the most significant issues at present and will make recommendations for addressing them and other rapidly developing technologies both now and in the future.

A NEW INFRASTRUCTURE

Although many people initially regard new technologies as intimidating, impersonal and intrusive, there has been a great change in attitudes toward such common technologies such as "voice mail", electronic or "e-mail", facsimile ("FAX") machines, computers, answering machines, and other technologies when they are well-designed and easy to use. As cutting edge information technologies continue to be developed, they too will be regarded in the future as commonplace and essential, and will be expected by citizens.

The importance of making these tools convenient to use cannot be underestimated. It has been said that when the telephone was first introduced, the growth in its use was so explosive that a telephone industry executive predicted that everyone would have to become a telephone operator in order to handle the demand for service. That is, of course, exactly what happened. The technology developed to a level that was easy to use, permitting average citizens to make their own calls. The same will be true of the technologies under development today.

Information technology already plays a significant role in public safety, economic development, entertainment, work, communication, and education, and will continue to expand its presence in the public areas of the daily lives of our citizenry. But, the coincident increase in use of computers by average citizens from their homes, along with the enormous growth in the use of the "Internet" has fueled the engine of one of the most substantial infrastructure development periods in decades.

We must realize that we are witnessing the leading edge of a new infrastructure much like the railroads, the interstate highway system, and the water, sewer, telephone, and gas and electric utilities.

As Grant County looks toward the future and the fast approaching 21st Century, it is crucial that the community develop and have in place the knowledge and guidelines necessary for the process of planning for the expanding use of these technologies. Recent federal and state legislation have already impacted the ability of local authorities to address these issues. The potential impact of ignoring these developments will be costly and will only further delay the necessity to plan for the future. The Comprehensive Plan Update is an appropriate avenue to address these issues and to develop recommendations for the future.

TWO GUIDING THEMES

These themes were:

- The desire for "Universal Access" to the various information technologies; and

- The linking of information technology and infrastructure to the four essential elements of the Comprehensive Plan:

    o Transportation

    o Community facilities

    o Utilities

    o Land use

UNIVERSAL ACCESS

The concept of "Universal Access" is defined as "**the ability of every citizen in the county to have access to information technology and infrastructure developments.**" This does not necessarily mean a computer or Internet access in every home, but the ability for every citizen to have such access if so desired. This ability might be made available through facilities located in public libraries, city halls, schools, or kiosks in shopping malls. It could also be provided in the home through any number of service providers. Many people already take advantage of this capability through modems and telephone lines.

LINKING TO THE COMPREHENSIVE PLAN

Initially, the best way to incorporate these issues and concerns into the Comprehensive Plan Update is to begin by relating them to the plan's Goals and Objectives and the required elements of the Comprehensive Plan. The following paragraphs are meant to describe some potential benefits, which could be realized through the implementation of information technologies.

Transportation - Information technology has the potential to alleviate dependency on vehicular trips to accomplish many tasks. For example, with a home computer one can now search for books at the Grant County Public Library. In many cases it is now possible to perform other tasks such as shopping and product ordering from home even without a home computer. Generally, this convenience has only been available from large mail order firms. However, with increased awareness and interest, these services could potentially be made available by local businesses. Home delivery of products ordered from local businesses such as groceries, drug stores, and hardware stores, once a common occurrence is again being implemented in many areas of the country. Trends such as these have the potential to reduce short trips, with a corresponding benefit in air quality improvement.

"**Telecommuting**" can especially reduce commuting to and from work, as people are increasingly able to work from their homes through the use of computers, modems and fax machines. The potential impact of increased telecommuting must also be examined in light of present and future zoning ordinances. Increased numbers of people working from their homes will raise questions and concerns about business activities in residential areas, which were more clear-cut in the past, but will require further examination and planning in the future.

The advent of "smart highway systems" such as **ARTIMIS,** the Advanced Regional Traffic Interactive Management and Information System, now being implemented in the Cincinnati Metropolitan Area, is also a good example of the use of information technology in the area of

transportation. This system will monitor traffic conditions on the region's major thoroughfares through the use of sensors installed in the roadways and remote control video cameras. When traffic delays or bottlenecks are detected, interactive road signs will display alert messages sent by operators to warn drivers of potential problems ahead and to suggest possible alternate routes.

These and other transportation related developments offer great promise and should be recognized, discussed, and encouraged where appropriate.

Community Facilities - Information technology can assist in providing access to information, materials and services typically found at city buildings, schools, libraries and other public agencies. The following examples for information technology and infrastructure related to community facilities should be examined.

Electronic linking of community facilities such as schools, libraries, city and county buildings and other facilities holds potential for improving access to information by the public. This would include the availability of public information on-line where practical. For example, documents can be published electronically (as is being done with this update of the Comprehensive Plan) for reduced cost of distribution while also making the information more accessible.

Potential improvements in public safety, which could be realized by installing smoke, fire and burglary detection systems, which could automatically link to emergency, dispatch services when activated. Although such systems are not yet perfected, their availability and usability will improve in the future.

New developments in information technologies and infrastructure will have an impact on physical design and capacity of public facilities as well, perhaps affecting building and parking capacities as well as building code and design features. For example, new city/county/public office facilities being built should be designed to accommodate computer networking/video-conferencing networking capabilities in the design stage rather than as an afterthought.

Sites for cellular phone towers, Personal Communication Services (PCS) equipment and other facilities could be evaluated through the use of Geographic Information Systems (GIS) technology. In particular, the concept of sharing facility sites among various cellular and PCS providers, where possible, has great potential for reducing the number of towers necessary to serve the area's communication needs.

Water/Sewer/Solid Waste - Technologies are now available which make it possible to read utility meters electronically and have the monthly readings sent to the utility headquarters. In some areas these systems are already in use. Utility service providers should be encouraged to examine such developments when installing new service capabilities.

If electronic meter reading is implemented, it may be feasible to implement other capabilities through the same system, or to install multiple systems so that if one fails, the other will back it up. With more immediate feedback of utility service usage, the utility service providers may be able to use this information to better design their systems to handle peak loads/capacities and better balance service demands. The feasibility of these suggestions is unknown at this time, but the potential benefits are significant, and the decision-makers must become aware of the many new possibilities on the horizon.

Maintenance of facilities can be aided through the use of GIS and Automated Mapping/Facilities Management Systems (AM/FM.) Such systems are designed to store highly accurate base maps of a region and any related information about the maps in a computer database. These maps are separated into "layers" such as roads, buildings, property lines, and so on. In this way, it is possible to deal with a single layer or with multiple layers of information.

Utilities can also map their facilities as individual layers on top of the common "master base map" in order to organize and use their information in a method that is consistent with other uses. For example, when planning to repair a sewer line, a simple search could show the location of any water or gas lines, which may be present. When repairing, replacing or maintaining existing facilities or installing new facilities, consideration should be given to these new capabilities.

The use of GIS to help site facilities such as landfills or to optimize school bus, public transit or solid waste pickup routes, must be more fully explored and encouraged. Use of this technology can provide a more tangible basis for decision making which otherwise can appear arbitrary if not properly explained.

Land Use - Identification of the best sites for recreational facilities, agricultural and/or preservation areas, and industrial parks should be done before land available for such uses becomes scarce. Again, GIS technology could be used in this effort by tracking land consumption over time and by use. Trends in development and demographics can also be more accurately tracked using GIS capabilities.

SIGNIFICANT TRENDS AND EXAMPLES

Why then is it necessary to plan for something, which in many cases is already available through existing facilities? The answer is, that while today's facilities are generally adequate for the uses being made of them, the increasing growth in the use of these technologies and the demand for faster and more reliable capabilities will increase dramatically in the coming years. Listed below are some examples of the services and capabilities, which will be dependent on developments in the information technology field:

Economic Development - Businesses will demand greater access to an information infrastructure, which is flexible and capable of handling their diverse needs. This is especially true when firms are looking to expand their operations. Communities, which are not prepared to accommodate such needs, may be passed over in the process.

Electronic Commerce - Closely related to economic development issues, electronic commerce deals with the exchange of purchase orders, invoices, and payments using an electronic standard. Another concept being developed - electronic, or "e-cash" will permit the purchase of goods and services electronically without the tracking of purchases for marketing purposes, by associating sales records to a person's bank or credit card account. This capability will help address privacy issues.

News Media - News organizations will take advantage of the capabilities in reporting news as it happens and as a means of distribution. Already several major news organizations and newspapers, including. **THE KENTUCKY POST, ENQUIRER, and THE GRANT COUNTY NEWS** have begun to explore this new electronic publishing frontier.

Education - Schools are teaching our children how to use these technologies. As the workers of the future, they will expect these capabilities to be available. Distance learning via video-conferencing/interactive television, as well as career training and other educational offerings, will be offered through current and developing technologies. Those not prepared risk being left behind as the information revolution juggernaut proceeds.

Medical - The medical professions already relies heavily on available information technologies and will increasingly require reliable, fast, and accurate exchange of information. Video-conferencing capabilities, in particular, hold great promise in extending the reach of the latest advances in health care from research hospitals to remote locations.

Telecommuting - Working from remote locations or from home will become more commonplace resulting in increasing demands for adequate information technology infrastructure. Banking, shopping, paying bills, submitting tax returns, performing research and using e-mail are among many of the activities and services, which will be feasible. Many of these have the potential to reduce short trips and save considerable time.

Government Organizations - Government agencies can take advantage of many capabilities to improve the delivery of services to the public. Publication and distribution of public records in electronic format, where practical, can help make information more accessible to the general public. "One-Stop Kiosks" can be designed to handle applications for permits and/or other necessary paperwork rather than forcing the citizen to visit several different locations.

Emergency Services - The Global Positioning System (GPS) is a system of satellites and equipment designed by the U. S. Department of Defense to permit personnel to determine their location anywhere on the face of the earth, 24 hours a day. In combination with GIS capabilities, emergency dispatchers can take advantage of GPS technology to more effectively dispatch police, fire, and ambulances to call locations. Emergency vehicles equipped with appropriate equipment can broadcast their locations to the central dispatching office every few seconds. In this way, they can be tracked in real time should further assistance or backup be required.

Another area, which should be examined for its potential in emergency situations, is the 800-megahertz radio system. This system is designed to permit either addressable communication from one station to another, or when necessary, to permit communication within or among groups of radios. In this way, emergency service providers could communicate individually and within their own organization under normal conditions, or in the case of a natural disaster or other emergency situation, could easily switch to a cooperative mode for coordinated response.

Kentucky Information Highway - The "Kentucky Information Highway" is a statewide initiative to make the latest advances in information technologies available to all public agencies in the state at a uniform rate. Many of the examples listed above are part of this initiative. The goals and objectives of the "Kentucky Information Highway" initiative should be examined for a greater understanding of its potential benefits to local government organizations.

Kentucky Statewide Base Map - The "Kentucky Statewide Base Map" is an initiative of Kentucky's "GIS Advisory Council", in cooperation with the United States Geological Survey (USGS), the Natural Resources Conservation Service (NRCS) - formerly the Soil Conservation Service - and the U. S. Forest Service (USFS), to map the entire commonwealth at a uniform scale for the purpose of making up-to-date mapping available for use by all state and local government agencies. This mapping will be sufficiently accurate to be used as a base for property mapping in all but the most urbanized areas of the state. The potential benefit of such a product to the state in the areas of economic development, transportation, tourism, environmental and natural resources, and conservation efforts is tremendous.

GUIDING THEME SUMMARY

Although incomplete, this list gives some idea of the scope and significance of the developments in the information technology arena. Since this is the first time these issues have been addressed in the Comprehensive Plan Update, by necessity the fundamental and most immediately applicable issues may take precedence over less obvious applications. However, it is important to recognize and acknowledge the dynamic nature of the field of information technology. One only has to examine the decisions, both good and bad, made by some communities during the eras of railroad and interstate highway system expansion and development, to understand the potential impact.

DECISION MAKING

The use and development of information technology and its accompanying infrastructure is inevitable, and is therefore something for which planning is required, for both the potential uses and for orderly and coordinated development.

It is critically important that citizens not be divided into the technology "**have and have-nots.**" Accordingly, as infrastructure developments occur, care must be exercised to ensure that providers are not allowed to "cherry pick" the areas, which they will or will not serve. Decision-makers must not inadvertently create situations, which prevent citizens from having the ability to take advantage of these developments. In other words, Universal Access needs to be a guiding principle in decision-making.

RECOMMENDATIONS

Community Plan - A unified county/region-wide plan needs to be developed for information technology.

Aggressive development of information technology infrastructure is taking place due to consumer demand and also due to changes brought about by the **Federal Communications Act of 1996.** Accordingly, a comprehensive, unified countywide/regional plan must be developed and implemented to address the needs and concerns of all jurisdictions and to prevent a fractious, piecemeal approach which could adversely affect the continued orderly development of the region.

A long-range goal should be to be able to offer everyone in Grant County the ability to have individual residential access to information technology and infrastructure if desired. A short-term goal should be to first make services available at local libraries, shopping malls, or other public places.

Education - Continuous efforts should be made to inform decision-makers and the general public about present and future information technology developments in a timely fashion.

Decision-makers must be well informed in order to make intelligent decisions. Training programs, on-going education, and public awareness programs will all contribute to the goal of making people aware of developments and their potential impacts. Since information technology developments are unfolding so rapidly, it is imperative that these educational efforts be sustained and continually offered in order to provide the most up-to-date information.

Cellular Towers, PCS Facilities and Satellite Dishes - Siting of cellular phone towers, Personal Communications System (PCS) facilities and satellite dishes should be subject to local review and approval.

The Federal Communications Act of 1996 has severely restricted, to the point of preempting local control, the ability of local authorities to control satellite dish placement for aesthetic reasons. Local authorities have no control over satellite dishes 1 meter (3.28 feet) or less in diameter in residential areas and 2 meters (6.56 feet) or less in commercial areas.

Prior to July 15, 1998, Under effective state statutes, cellular towers and their facilities were only, subject to local review and control when located in Jefferson County, KY. Presumably this will also be the case with the new PCS facilities, which will require much higher densities to provide for adequate coverage. Effective July 15, 1998, local review and control authority has been extended statewide under the jurisdiction of local planning commissions, where applicable, per H.B. 168.

Infrastructure within the public right-of-way is still subject to local control. However, under current state and federal restrictions regarding cellular, PCS and satellite dish technologies, it is a simple matter to bypass local review and control as none of these technologies are restricted by right-of-way access. Legislative initiatives in this area should be examined and considered.

Sites for cellular phone towers, Personal Communication Services (PCS), satellite dishes, and other similar technologies, which may be developed, should be examined and evaluated through technologies such as GIS and computer imaging. GIS can be used to locate optimal sites for facilities while computer imaging permits creation of visual models of proposed facilities. Service providers themselves use these technologies when making presentations before boards and commissions in areas of the country having local review and control authority.

Service providers should be required, where feasible, to share towers and site facilities in order to minimize their proliferation. Aesthetic issues are prominent and will need to be addressed at the local level. It will be important also, as new technologies make such towers or other facilities unnecessary to assure their removal and disposal.

The following design standards should be used when evaluation the siting of such facilities. Where the planning commission finds that circumstances or conditions, relating to the particular site are such that one or more of the design standards listed below are not necessary or desirable for the protection of surrounding property or the public health, safety, and general welfare, and that such special conditions or circumstances make one or more said design standards unreasonable, the planning commission may modify or waive such requirement, either permanently or on a temporary basis. The applicant should request any such modification or waiver, and the applicant should submit a written justification for each requested modification or waiver.

All structures, except fences, should be located at least fifty (50) feet from the property line or lease line of any residentially zoned property.

A cellular antenna tower, or alternative antenna tower structure, may be constructed to a maximum height of two hundred (200) feet regardless of the maximum height requirements listed in the specific zoning district. This also applies to any tower taller than fifteen (15) feet constructed on the top of another building or structure, with the height being the overall height of building/structure and tower together, measured from the arcade to the highest point. The planning commission may allow antennas greater than two hundred feet in height upon review of the applicant's application.

When any cellular antenna tower, or alternative antenna tower structure, is taller than the distance from its base to the nearest property line or lease line, the applicant should furnish the planning commission with a certification from an engineer registered in the Commonwealth of Kentucky that the tower will withstand winds of seventy (70) mile per hour, in accordance with current ANSI/EIA/TIA standards.

Cellular antenna towers should not be illuminated, except in accord with other state or federal regulations

The site should have no full-time staff; personnel may periodically visit the site for maintenance, equipment modification, or repairs. To accommodate such visits, in areas/egress should only be from approved access points.

A minimum of one (1) off-street parking space, per provider, should be provided on the site.

Woven wire or chain link (eighty- (80) percent open) or solid fences made from wood or other materials (less than fifty (50) percent open), should be used to enclose the site. Such fences should not be less than four (4) feet in height nor more than eight (8) feet in height. The use of

barbed wire or sharp pointed fences should be prohibited. Such fence may be located within the front, side, or rear yard.

Screening should be required where the site in question abuts residentially zone property. Screening should be minimum height of six (6) feet, planted in a staggered pattern at a maximum distance of fifteen (15) feet on center. The screening should to be placed in an area between the property line, or lease line, and a ten (10) foot setback.

Any site to be purchased or leased for the installation of a cellular antenna tower, or alternative antenna tower, and ancilla[y facilities, should comply with the minimum lot size requirements of the zone in which the facility is to be located, provided that such area should not be required to exceed one-half (1/2) acre.

Surfacing of all driveways and off-street parking areas should comply with the requirements of the applicable local zoning ordinance.

There should be no signs permitted, except those displaying emergency information, owner contact information, warning or safety instructions, or signs, which are required by a federal, state, or local agency. Such signs should not exceed five (5) square feet in area.

All new cellular antenna towers should be designed and constructed to accommodate a minimum of three (3) service providers.

All option and site lease agreements should contain non-exclusive co-location clauses.

The following is a list of criteria that is recommended to be used when evaluating the siting of such facilities:

Cellular Phone Service Providers should be required to co-locate or share tower/facilities with other providers in order to minimize the proliferation of towers/facilities.

Wherever possible, service providers should be required to use existing structures or facilities, which meet all of the requirements of the proposed installation. For example, water towers, radio and television towers, tall buildings, commercial signs, church steeples, etc., in order to minimize the proliferation of new towers/facilities.

Wherever possible, siting of such facilities should be required to be located in areas identified for industrial or commercial type uses.

When located in residential areas, such facilities should be heavily screened from view and towers should be camouflaged or designed in such a manner to blend into the surrounding area. Changes in topography of the land can be used effectively to separate such facilities from adjacent residential uses.

To provide for proper separation, adequate setbacks should be provided based upon adjacent land uses.

The type of tower (e.g., monopole, carillon, etc.) should be evaluated based upon adjacent land uses and character of affected areas.

When the facility is no longer required, the owner should remove it and the land restored to its natural state.

Extent to which the proposal is consistent with the purposes of these regulations.

Adequacy of the proposed site, considering such factors as the sufficiency of the size of the site to comply with the established criteria, the configuration of the site, and the extent to which

the site is formed by logical boundaries (e.a. topography, natural features, streets, relationship of adjacent uses, etc.).

Extent to which the proposal responds to the impact of the proposed development on adjacent land uses, especially in terms of visual impact.

Extent to which the proposed cellular antenna towers camouflaged (i.e., use of stealth technology").

Extent to which the proposed facility is integrated with existing structures (i.e., buildings signs)